

REMARKS

This application, as amended herein, contains claims 1-25.

Claims 2 and 5 were objected to by the Examiner. Claim 2 has been amended in accordance with the helpful suggestion of the Examiner. Claim 4 has been amended to depend from claim 3, so that different combinations of elements are claimed, and so that claim 5 is no longer a substantial duplicate of claim 4. Thus, it is respectfully submitted that the claim objections should be withdrawn.

A replacement sheet for Figure 2 of the drawings is submitted herewith. It shows the floor, the tiles and the space beneath the tiles. Care has been taken to avoid introducing any new matter. The paragraph of the specification extending from page 10, line 16 to page 11, line 6 has been amended to be consistent with replacement Figure 2. Further, the specification has been amended to include a statement of government rights, inadvertently omitted upon filing.

Claims 6-13 and 15 were rejected under 35 U.S.C. 112, second paragraph. As noted above, the claimed elements are now shown in the drawings. Accordingly, it is respectfully submitted that the rejection under 35 U.S.C. 112, second paragraph should be withdrawn.

Claims 1-5, 14, 16, 23-25 were rejected as anticipated by Omori. Claims 6-13, 15 and 22 were rejected as obvious

over Omori. Claims 17 and 18 were rejected as obvious over Omori in view of Kondou et al. Finally, claims 19-21 were rejected as obvious over Omori in view of McKeen et al. For the following reasons, these rejections are respectfully traversed.

Independent claim 1 has been amended to recite:

"the cross sectional area of each plenum being substantially matched to local volumetric flow rate, whereby pressure drop of fluid flowing in the plenums is reduced." Neither Omori, nor any of the other prior art of record teaches or suggests this approach. Support for this amendment may be found in the paragraph bridging pages 10 and 11 of the specification.

By matching the cross sectional area to the required local volumetric flow rate, several important advantages are produced:

1. As specifically stated in claim 1, the pressure drop of fluid flowing in the plenums is reduced. This is because, as discovered by the present inventor, that volumetric flow rate in the cold plenum decreases with distance from the floor, whereas volumetric flow rate in the hot plenum increases with distance from the floor.
2. As specifically noted in the paragraph bridging pages 10 and 11 of the specification, this allows a fixed amount of plenum space, to incur less pressure drop and thereby to carry more air (for a given arrangement of fans or blowers), leading to enhanced cooling and lower

temperatures of the electronics. This lowering of temperature is extremely significant, as noted in the specification, in that keeping electronic chips cool is extremely important, because as noted in the specification, at page 13, lines 21-25, according to a common rule of thumb used for processing chips, a chip's lifetime doubles and its performance (speed) increases 2-3 percent for every 1° C it is run below its maximum (spec) temperature.

3. As also note in the specification, on page 13, the cost of floor space in such an installation is high; air-flow plenums may occupy a considerable fraction of the total and thus represent a considerable cost. Applicant's invention takes advantage of available floor space, producing maximum cooling for a given area of floor space.

4. Applicant's invention, as set forth in claim 1, may mean the difference between success and failure of a given design (see specification, page 14, lines 7 - 16).

5. Space-efficient plenums allow racks to be closer together, which may lead to improved signal integrity on interconnecting cables (see specification, page 14, lines 18 - 20).

Omori does not teach or suggest Applicant's invention, as set forth in claim 1. At best Omori is directed principally to separating cooling air for racks of printed circuit boards, the vertical boards being of "high caloric value" and the horizontal boards being of "low caloric value". There is little said with respect to Figs. 6 and 7

which Omori alleges to be prior art. Specifically, it is submitted that there is no teaching or suggestion of the cross sectional area of each plenum being substantially matched to local volumetric flow rate, whereby pressure drop of fluid flowing in the plenums is reduced, as recited in claim 1. Further, there is no teaching or suggestion of the many advantages that result from this arrangement, as also specifically recited in claim 1. Thus, it is respectfully submitted that claim 1 is directed to patentable subject matter.

Claims 24 and 25 have been amended in a manner analogous to claim 1. Thus, it is respectfully submitted that claims 24 and 25 are also directed to patentable subject matter.

The remaining claims depend from independent claim 1. These claims have further recitations, which in combination with the recitations of claim 1, are not shown or suggested in the art of record.

With specific reference to claims 17 and 18, it is respectfully submitted that the curved elements in the figures of Kondou et al. referred to by the Examiner are not in fact partitions. In Fig. 12, item 24 is a large propeller (column 9, line 40). In Figs. 16, item 5 is a slit plate or plates which depend into the flowing fluid and essentially act as heat sinks (column 10, lines 12-20). In Fig. 19, item 5 guides cooling air (column 10, lines 32-42). Finally, in Fig. 32, item 18 is a wing-shaped slit plate (column 12, line 54). These structures either move

air or direct its flow. They are in no way partitions to the flow of cooling air. Thus, it is submitted that claims 17 and 18 are also directed to patentable subject matter.

It is respectfully submitted that the combination of Omori and McKeen et al. does not render claims 19-21 obvious. There is very important advantage to the structure of claims 19-22 (as well as to that of claims 17 and 18 discussed above) in that the resulting convexity of the partition prevents undue restriction of the exhaust flow from the lowest portions or the plenum, which could cause some resistance to flow produced by the fans 62 in the lowest position (see specification, paragraph bridging pages 20 and 21, and explanation in the following paragraph on page 21). Neither Omori nor McKeen, whether taken alone or in combination, teach or suggest Applicant's invention, nor have any appreciation for the advantages of Applicant's invention, as specifically disclosed in the specification. It is thus submitted that all of these claims are also directed to patentable subject matter.

Reconsideration and allowance are respectfully requested. A check for \$450 to cover the fee for a two-month extension of time in which to respond to the Office Action is enclosed herewith.

Respectfully submitted,

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